SEQUENCE LISTING

<110> Behl, Christian
       Klostermann, Andreas

<120> Human semaphorin 6A-1 (SEMA6A-A), a gene involved in neuronal
       development and regeneration mechanisms during apoptosis, and its
       use as a potential drug target

<130> 48498-0100 (48498-258443)

<140> US 09/856,681
<141> 2001-08-03

<150> PCT/EP99/09215
<151> 1999-11-26

<150> EP 98122441.3
<151> 1998-11-26

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<170> PatentIn version 3.2

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Asn Tyr Thr Lys Gln Tyr Pro Val Phe Val Gly His Lys Pro Gly Arg
            35   40   45

aac acc aca cag agg cac agg ctg gac atc cag atg att atg atc atg   192
Asn Thr Thr Gln Arg His Arg Leu Asp Ile Gln Met Ile Met Ile Met
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ata gac aca tca cac acg gaa gaa att tat tgt agc aaa aaa ctg aca        288
Ile Asp Thr Ser His Thr Glu Glu Ile Tyr Cys Ser Lys Lys Leu Thr
            85              90              95

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Trp Lys Ser Arg Gln Ala Asp Val Asp Thr Cys Arg Met Lys Gly Lys
            100             105             110

cat aag gat gag tgc cac aac ttt att aaa gtt ctt cta aag aaa aac        384
His Lys Asp Glu Cys His Asn Phe Ile Lys Val Leu Leu Lys Lys Asn
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gat gat gca ttg ttt gtc tgt gga act aat gcc ttc aac cct tcc tgc        432
Asp Asp Ala Leu Phe Val Cys Gly Thr Asn Ala Phe Asn Pro Ser Cys
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aga aac tat aag atg gat aca ttg gaa cca ttc ggg gat gaa ttc agc        480
Arg Asn Tyr Lys Met Asp Thr Leu Glu Pro Phe Gly Asp Glu Phe Ser
145             150             155             160

gga atg gcc aga tgc cca tat gat gcc aaa cat gcc aac gtt gca ctg        528
Gly Met Ala Arg Cys Pro Tyr Asp Ala Lys His Ala Asn Val Ala Leu
            165             170             175

ttt gca gat gga aaa cta tac tca gcc aca gtg act gac ttc ctt gcc        576
Phe Ala Asp Gly Lys Leu Tyr Ser Ala Thr Val Thr Asp Phe Leu Ala
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att gac gca gtc att tac cgg agt ctt gga gaa agc cct acc ctg cgg        624
Ile Asp Ala Val Ile Tyr Arg Ser Leu Gly Glu Ser Pro Thr Leu Arg
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acc gtc aag cac gat tca aaa tgg ttg aaa gaa cca tac ttt gtt caa        672
Thr Val Lys His Asp Ser Lys Trp Leu Lys Glu Pro Tyr Phe Val Gln
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gcc gtg gat tac gga gat tat atc tac ttc ttc ttc agg gaa ata gca        720
Ala Val Asp Tyr Gly Asp Tyr Ile Tyr Phe Phe Phe Arg Glu Ile Ala
225             230             235             240

gtg gag tat aac acc atg gga aag gta gtt ttc cca aga gtg gct cag        768
Val Glu Tyr Asn Thr Met Gly Lys Val Val Phe Pro Arg Val Ala Gln
            245             250             255

gtt tgt aag aat gat atg gga gga tct caa aga gtc ctg gag aaa cag        816
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tct cat ttt tat ttc aac att ctc cag gca gtt aca gat gtg att cgt        912
Ser His Phe Tyr Phe Asn Ile Leu Gln Ala Val Thr Asp Val Ile Arg
        290                 295                 300

atc aac ggg cgt gat gtt gtc ctg gca acg ttt tct aca cct tat aac        960
Ile Asn Gly Arg Asp Val Val Leu Ala Thr Phe Ser Thr Pro Tyr Asn
305                 310                 315                 320

agc atc cct ggg tct gca gtc tgt gcc tat gac atg ctt gac att gcc       1008
Ser Ile Pro Gly Ser Ala Val Cys Ala Tyr Asp Met Leu Asp Ile Ala
                325                 330                 335

agt gtt ttt act ggg aga ttc aag gaa cag aag tct cct gat tcc acc       1056
Ser Val Phe Thr Gly Arg Phe Lys Glu Gln Lys Ser Pro Asp Ser Thr
                340                 345                 350

tgg aca cca gtt cct gat gaa cga gtt cct aag ccc agg cca ggt tgc       1104
Trp Thr Pro Val Pro Asp Glu Arg Val Pro Lys Pro Arg Pro Gly Cys
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Cys Ala Gly Ser Ser Ser Leu Glu Arg Tyr Ala Thr Ser Asn Glu Phe
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cct gat gat acc ctg aac ttc atc aag acg cac ccg ctc atg gat gag       1200
Pro Asp Asp Thr Leu Asn Phe Ile Lys Thr His Pro Leu Met Asp Glu
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gca gtg ccc tcc atc ttc aac agg cca tgg ttc ctg aga aca atg gtc       1248
Ala Val Pro Ser Ile Phe Asn Arg Pro Trp Phe Leu Arg Thr Met Val
                405                 410                 415

aga tac cgc ctt acc aaa att gca gtg gac aca gct gct ggg cca tat       1296
Arg Tyr Arg Leu Thr Lys Ile Ala Val Asp Thr Ala Ala Gly Pro Tyr
                420                 425                 430

cag aat cac act gtg gtt ttt ctg gga tca gag aag gga atc atc ttg       1344
Gln Asn His Thr Val Val Phe Leu Gly Ser Glu Lys Gly Ile Ile Leu
                435                 440                 445

aag ttt ttg gcc aga ata gga aat agt ggt ttt cta aat gac agc ctt       1392
Lys Phe Leu Ala Arg Ile Gly Asn Ser Gly Phe Leu Asn Asp Ser Leu
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ttc ctg gag gag atg agt gtt tac aac tct gaa aaa tgc agc tat gat       1440
Phe Leu Glu Glu Met Ser Val Tyr Asn Ser Glu Lys Cys Ser Tyr Asp
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                485                     490                     495

agc tct ctg tat gtt gcg ttc tct acc tgt gtg ata aag gtt ccc ctt    1536
Ser Ser Leu Tyr Val Ala Phe Ser Thr Cys Val Ile Lys Val Pro Leu
                500                     505                     510

ggc cgg tgt gaa cga cat ggg aag tgt aaa aaa acc tgt att gcc tcc    1584
Gly Arg Cys Glu Arg His Gly Lys Cys Lys Lys Thr Cys Ile Ala Ser
            515                     520                     525

aga gac cca tat tgt gga tgg ata aag gaa ggt ggt gcc tgc agc cat    1632
Arg Asp Pro Tyr Cys Gly Trp Ile Lys Glu Gly Gly Ala Cys Ser His
        530                     535                     540

tta tca ccc aac agc aga ctg act ttt gag cag gac ata gag cgt ggc    1680
Leu Ser Pro Asn Ser Arg Leu Thr Phe Glu Gln Asp Ile Glu Arg Gly
545                     550                     555                     560

aat aca gat ggt ctg ggg gac tgt cac aat tcc ttt gtg gca ctg aat    1728
Asn Thr Asp Gly Leu Gly Asp Cys His Asn Ser Phe Val Ala Leu Asn
                565                     570                     575

ggg cat tcc agt tcc ctc ttg ccc agc aca acc aca tca gat tcg acg    1776
Gly His Ser Ser Ser Leu Leu Pro Ser Thr Thr Thr Ser Asp Ser Thr
                580                     585                     590

gct caa gag ggg tat gag tct agg gga gga atg ctg gac tgg aag cat    1824
Ala Gln Glu Gly Tyr Glu Ser Arg Gly Gly Met Leu Asp Trp Lys His
            595                     600                     605

ctg ctt gac tca cct gac agc aca gac cct ttg ggg gca gtg tct tcc    1872
Leu Leu Asp Ser Pro Asp Ser Thr Asp Pro Leu Gly Ala Val Ser Ser
        610                     615                     620

cat aat cac caa gac aag aag gga gtg att cgg gaa agt tac ctc aaa    1920
His Asn His Gln Asp Lys Lys Gly Val Ile Arg Glu Ser Tyr Leu Lys
625                     630                     635                     640

ggc cac gac cag ctg gtt ccc gtc acc ctc ttg gcc att gca gtc atc    1968
Gly His Asp Gln Leu Val Pro Val Thr Leu Leu Ala Ile Ala Val Ile
                645                     650                     655

ctg gct ttc gtc atg ggg gcc gtc ttc tcg ggc atc acc gtc tac tgc    2016
Leu Ala Phe Val Met Gly Ala Val Phe Ser Gly Ile Thr Val Tyr Cys
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gtc tgt gat cat cgg cgc aaa gac gtg gct gtg gtg cag cgc aag gag    2064
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Val Cys Asp His Arg Arg Lys Asp Val Ala Val Val Gln Arg Lys Glu
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Lys Glu Leu Thr His Ser Arg Arg Gly Ser Met Ser Ser Val Thr Lys
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ctc agc ggc ctc ttt ggg gac act caa tcc aaa gac cca aag ccg gag      2160
Leu Ser Gly Leu Phe Gly Asp Thr Gln Ser Lys Asp Pro Lys Pro Glu
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gcc atc ctc acg cca ctc atg cac aac ggc aag ctc gcc act ccc ggc      2208
Ala Ile Leu Thr Pro Leu Met His Asn Gly Lys Leu Ala Thr Pro Gly
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aac acg gcc aag atg ctc att aaa gca gac cag cac cac ctg gac ctg      2256
Asn Thr Ala Lys Met Leu Ile Lys Ala Asp Gln His His Leu Asp Leu
            740             745             750

acg gcc ctc ccc acc cca gag tca acc cca acg ctg cag cag aag cgg      2304
Thr Ala Leu Pro Thr Pro Glu Ser Thr Pro Thr Leu Gln Gln Lys Arg
            755             760             765

aag ccc agc cgc ggc agc cgc gag tgg gag agg aac cag aac ctc atc      2352
Lys Pro Ser Arg Gly Ser Arg Glu Trp Glu Arg Asn Gln Asn Leu Ile
        770             775             780

aat gcc tgc aca aag gac atg ccc ccc atg ggc tcc cct gtg att ccc      2400
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785             790             795             800

acg gac ctg ccc ctg cgg gcc tcc ccc agc cac atc ccc agc gtg gtg      2448
Thr Asp Leu Pro Leu Arg Ala Ser Pro Ser His Ile Pro Ser Val Val
            805             810             815

gtc ctg ccc atc acg cag cag ggc tac cag cat gag tac gtg gac cag      2496
Val Leu Pro Ile Thr Gln Gln Gly Tyr Gln His Glu Tyr Val Asp Gln
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ccc aaa atg agc gag gtg gcc cag atg gcg ctg gag gac cag gcc gcc      2544
Pro Lys Met Ser Glu Val Ala Gln Met Ala Leu Glu Asp Gln Ala Ala
            835             840             845

aca ctg gag tat aag acc atc aag gaa cat ctc agc agc aag agt ccc      2592
Thr Leu Glu Tyr Lys Thr Ile Lys Glu His Leu Ser Ser Lys Ser Pro
        850             855             860

aac cat ggg gtg aac ctt gtg gag aac ctg gac agc ctg ccc ccc aaa      2640
Asn His Gly Val Asn Leu Val Glu Asn Leu Asp Ser Leu Pro Pro Lys
865             870             875             880
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gtt cca cag cgg gag gcc tcc ctg ggt ccc ccg gga gcc tcc ctg tct        2688
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            885                 890                 895

cag acc ggt cta agc aag cgg ctg gaa atg cac cac tcc tct tcc tac        2736
Gln Thr Gly Leu Ser Lys Arg Leu Glu Met His His Ser Ser Ser Tyr
            900                 905                 910

ggg gtt gac tat aag agg agc tac ccc acg aac tcg ctc acg aga agc        2784
Gly Val Asp Tyr Lys Arg Ser Tyr Pro Thr Asn Ser Leu Thr Arg Ser
            915                 920                 925

cac cag gcc acc act ctc aaa aga aac aac act aac tcc tcc aat tcc        2832
His Gln Ala Thr Thr Leu Lys Arg Asn Asn Thr Asn Ser Ser Asn Ser
            930                 935                 940

tct cac ctc tcc aga aac cag agc ttt ggc agg gga gac aac ccg ccg        2880
Ser His Leu Ser Arg Asn Gln Ser Phe Gly Arg Gly Asp Asn Pro Pro
945                 950                 955                 960

ccc gcc ccg cag agg gtg gac tcc atc cag gtg cac agc tcc cag cca        2928
Pro Ala Pro Gln Arg Val Asp Ser Ile Gln Val His Ser Ser Gln Pro
            965                 970                 975

tct ggc cag gcc gtg act gtc tcg agg cag ccc agc ctc aac gcc tac        2976
Ser Gly Gln Ala Val Thr Val Ser Arg Gln Pro Ser Leu Asn Ala Tyr
            980                 985                 990

aac tca ctg aca agg tcg ggg ctg  aag cgt acg ccc tcg  cta aag ccg      3024
Asn Ser Leu Thr Arg Ser Gly Leu  Lys Arg Thr Pro Ser  Leu Lys Pro
            995                 1000                1005

gac gta  ccc ccc aaa cca tcc  ttt gct ccc ctt tcc  aca tcc atg         3069
Asp Val  Pro Pro Lys Pro Ser  Phe Ala Pro Leu Ser  Thr Ser Met
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Asn Tyr Thr Lys Gln Tyr Pro Val Phe Val Gly His Lys Pro Gly Arg
        35   40   45

Asn Thr Thr Gln Arg His Arg Leu Asp Ile Gln Met Ile Met Ile Met
    50   55   60

Asn Gly Thr Leu Tyr Ile Ala Ala Arg Asp His Ile Tyr Thr Val Asp
65   70   75   80

Ile Asp Thr Ser His Thr Glu Glu Ile Tyr Cys Ser Lys Lys Leu Thr
            85   90   95

Trp Lys Ser Arg Gln Ala Asp Val Asp Thr Cys Arg Met Lys Gly Lys
            100   105   110

His Lys Asp Glu Cys His Asn Phe Ile Lys Val Leu Leu Lys Lys Asn
        115   120   125

Asp Asp Ala Leu Phe Val Cys Gly Thr Asn Ala Phe Asn Pro Ser Cys
    130   135   140

Arg Asn Tyr Lys Met Asp Thr Leu Glu Pro Phe Gly Asp Glu Phe Ser
145   150   155   160

Gly Met Ala Arg Cys Pro Tyr Asp Ala Lys His Ala Asn Val Ala Leu
            165   170   175

Phe Ala Asp Gly Lys Leu Tyr Ser Ala Thr Val Thr Asp Phe Leu Ala
            180   185   190

Ile Asp Ala Val Ile Tyr Arg Ser Leu Gly Glu Ser Pro Thr Leu Arg
        195   200   205

Thr Val Lys His Asp Ser Lys Trp Leu Lys Glu Pro Tyr Phe Val Gln
210   215   220

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Ala Val Asp Tyr Gly Asp Tyr Ile Tyr Phe Phe Phe Arg Glu Ile Ala
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Val Glu Tyr Asn Thr Met Gly Lys Val Val Phe Pro Arg Val Ala Gln
                245             250                 255

Val Cys Lys Asn Asp Met Gly Gly Ser Gln Arg Val Leu Glu Lys Gln
                260             265                 270

Trp Thr Ser Phe Leu Lys Ala Arg Leu Asn Cys Ser Val Pro Gly Asp
        275             280                 285

Ser His Phe Tyr Phe Asn Ile Leu Gln Ala Val Thr Asp Val Ile Arg
        290             295                 300

Ile Asn Gly Arg Asp Val Val Leu Ala Thr Phe Ser Thr Pro Tyr Asn
305             310             315                     320

Ser Ile Pro Gly Ser Ala Val Cys Ala Tyr Asp Met Leu Asp Ile Ala
                325             330                 335

Ser Val Phe Thr Gly Arg Phe Lys Glu Gln Lys Ser Pro Asp Ser Thr
            340             345                 350

Trp Thr Pro Val Pro Asp Glu Arg Val Pro Lys Pro Arg Pro Gly Cys
        355             360                 365

Cys Ala Gly Ser Ser Ser Leu Glu Arg Tyr Ala Thr Ser Asn Glu Phe
        370             375             380

Pro Asp Asp Thr Leu Asn Phe Ile Lys Thr His Pro Leu Met Asp Glu
385             390             395                     400

Ala Val Pro Ser Ile Phe Asn Arg Pro Trp Phe Leu Arg Thr Met Val
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Arg Tyr Arg Leu Thr Lys Ile Ala Val Asp Thr Ala Ala Gly Pro Tyr
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         450                  455                  460


     Phe Leu Glu Glu Met Ser Val Tyr Asn Ser Glu Lys Cys Ser Tyr Asp
     465                 470                  475                  480


     Gly Val Glu Asp Lys Arg Ile Met Gly Met Gln Leu Asp Arg Ala Ser
                 485                  490                  495


     Ser Ser Leu Tyr Val Ala Phe Ser Thr Cys Val Ile Lys Val Pro Leu
             500                  505                  510


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             515                  520                  525


     Arg Asp Pro Tyr Cys Gly Trp Ile Lys Glu Gly Gly Ala Cys Ser His
             530                  535                  540


     Leu Ser Pro Asn Ser Arg Leu Thr Phe Glu Gln Asp Ile Glu Arg Gly
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     Asn Thr Asp Gly Leu Gly Asp Cys His Asn Ser Phe Val Ala Leu Asn
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     Gly His Ser Ser Ser Leu Leu Pro Ser Thr Thr Thr Ser Asp Ser Thr
                 580                  585                  590


     Ala Gln Glu Gly Tyr Glu Ser Arg Gly Gly Met Leu Asp Trp Lys His
             595                  600                  605


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His Asn His Gln Asp Lys Lys Gly Val Ile Arg Glu Ser Tyr Leu Lys
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Gly His Asp Gln Leu Val Pro Val Thr Leu Leu Ala Ile Ala Val Ile
                645   650   655

Leu Ala Phe Val Met Gly Ala Val Phe Ser Gly Ile Thr Val Tyr Cys
            660   665   670

Val Cys Asp His Arg Arg Lys Asp Val Ala Val Val Gln Arg Lys Glu
        675   680   685

Lys Glu Leu Thr His Ser Arg Arg Gly Ser Met Ser Ser Val Thr Lys
    690   695   700

Leu Ser Gly Leu Phe Gly Asp Thr Gln Ser Lys Asp Pro Lys Pro Glu
705   710   715   720

Ala Ile Leu Thr Pro Leu Met His Asn Gly Lys Leu Ala Thr Pro Gly
            725   730   735

Asn Thr Ala Lys Met Leu Ile Lys Ala Asp Gln His His Leu Asp Leu
            740   745   750

Thr Ala Leu Pro Thr Pro Glu Ser Thr Pro Thr Leu Gln Gln Lys Arg
        755   760   765

Lys Pro Ser Arg Gly Ser Arg Glu Trp Glu Arg Asn Gln Asn Leu Ile
    770   775   780

Asn Ala Cys Thr Lys Asp Met Pro Pro Met Gly Ser Pro Val Ile Pro
785   790   795   800

Thr Asp Leu Pro Leu Arg Ala Ser Pro Ser His Ile Pro Ser Val Val
            805   810   815

Val Leu Pro Ile Thr Gln Gln Gly Tyr Gln His Glu Tyr Val Asp Gln
        820   825   830

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Pro Lys Met Ser Glu Val Ala Gln Met Ala Leu Glu Asp Gln Ala Ala
    835                 840             845

Thr Leu Glu Tyr Lys Thr Ile Lys Glu His Leu Ser Ser Lys Ser Pro
    850             855             860

Asn His Gly Val Asn Leu Val Glu Asn Leu Asp Ser Leu Pro Pro Lys
865             870             875             880

Val Pro Gln Arg Glu Ala Ser Leu Gly Pro Pro Gly Ala Ser Leu Ser
            885 .               890             895

Gln Thr Gly Leu Ser Lys Arg Leu Glu Met His His Ser Ser Ser Tyr
            900             905             910

Gly Val Asp Tyr Lys Arg Ser Tyr Pro Thr Asn Ser Leu Thr Arg Ser
            915             920             925

His Gln Ala Thr Thr Leu Lys Arg Asn Asn Thr Asn Ser Ser Asn Ser
    930             935             940

Ser His Leu Ser Arg Asn Gln Ser Phe Gly Arg Gly Asp Asn Pro Pro
945             950             955             960

Pro Ala Pro Gln Arg Val Asp Ser Ile Gln Val His Ser Ser Gln Pro
            965             970             975

Ser Gly Gln Ala Val Thr Val Ser Arg Gln Pro Ser Leu Asn Ala Tyr
            980             985             990

Asn Ser Leu Thr Arg Ser Gly Leu  Lys Arg Thr Pro Ser  Leu Lys Pro
    995             1000            1005

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cag cca tct ggc cag gcc gtg act gtc tcg agg cag ccc agc ctc aac        96
Gln Pro Ser Gly Gln Ala Val Thr Val Ser Arg Gln Pro Ser Leu Asn
                20                  25                  30


gcc tac aac tca ctg aca agg tcg ggg ctg aag cgt acg ccc tcg cta       144
Ala Tyr Asn Ser Leu Thr Arg Ser Gly Leu Lys Arg Thr Pro Ser Leu
                35                  40                  45


aag ccg gac gta ccc ccc aaa cca tcc ttt gct ccc ctt tcc aca tcc       192
Lys Pro Asp Val Pro Pro Lys Pro Ser Phe Ala Pro Leu Ser Thr Ser
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Met Lys Pro Asn Asp Ala Cys Thr
65                  70



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1               5                   10                  15


Gln Pro Ser Gly Gln Ala Val Thr Val Ser Arg Gln Pro Ser Leu Asn
                20                  25                  30


Ala Tyr Asn Ser Leu Thr Arg Ser Gly Leu Lys Arg Thr Pro Ser Leu
                35                  40                  45
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Lys Pro Asp Val Pro Pro Lys Pro Ser Phe Ala Pro Leu Ser Thr Ser
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Met Lys Pro Asn Asp Ala Cys Thr
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Pro Gln Ala Lys Pro His Val Gln Pro Gln Pro Val Ser Ser Ala Asn
            20              25              30

Thr Gln Pro Arg Gly Pro Leu Ser Gln Ala Pro Thr Pro Ala Pro Lys
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Phe Ala Pro Val Ala Pro Lys Phe Thr Pro Val Val Ser Lys Phe Ser
    50                  55              60

Pro
65
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agcggccagc atcaccacac ccgcggcacc gcgctgccgg ccgcagagcc gggccagagc    180

cttgccccc  tcccccagcc cccaccccgc cccccgccct gaaatgactt gttaatcggc    240

gcagacacca ccaagggggac tcaccgaagt ggaatccaag tggaatttgg atttggagaa   300

gagtttcttg aacatttacc ctcttccttg ttggttttct ttttcttttt cttctttttt    360

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taatggatta ctaaatggga tacacgctgt accagttcgc tccgagcccc ggccgcctgt   600

ccgtcgatgc accgaaaagg gtgaagtaga gaaataaagt ctccccgctg aactact      657
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atg agg tca gaa gcc ttg ctg cta tat ttc aca ctg cta cac ttt gct    705
Met Arg Ser Glu Ala Leu Leu Leu Tyr Phe Thr Leu Leu His Phe Ala
1               5                   10                  15

ggg gct ggt ttc cca gaa gat tct gag cca atc agt att tcg cat ggc    753
Gly Ala Gly Phe Pro Glu Asp Ser Glu Pro Ile Ser Ile Ser His Gly
            20                  25                  30

aac tat aca aaa cag tat ccg gtg ttt gtg ggc cac aag cca gga cgg    801
Asn Tyr Thr Lys Gln Tyr Pro Val Phe Val Gly His Lys Pro Gly Arg
            35                  40                  45

aac acc aca cag agg cac agg ctg gac atc cag atg att atg atc atg    849
Asn Thr Thr Gln Arg His Arg Leu Asp Ile Gln Met Ile Met Ile Met
        50                  55                  60

aac gga acc ctc tac att gct gct agg gac cat att tat act gtt gat    897
Asn Gly Thr Leu Tyr Ile Ala Ala Arg Asp His Ile Tyr Thr Val Asp
65                  70                  75                  80

ata gac aca tca cac acg gaa gaa att tat tgt agc aaa aaa ctg aca    945
Ile Asp Thr Ser His Thr Glu Glu Ile Tyr Cys Ser Lys Lys Leu Thr
                85                  90                  95

tgg aaa tct aga cag gcc gat gta gac aca tgc aga atg aag gga aaa    993
Trp Lys Ser Arg Gln Ala Asp Val Asp Thr Cys Arg Met Lys Gly Lys
                100                 105                 110

cat aag gat gag tgc cac aac ttt att aaa gtt ctt cta aag aaa aac    1041
His Lys Asp Glu Cys His Asn Phe Ile Lys Val Leu Leu Lys Lys Asn
            115                 120                 125
```

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gat gat gca ttg ttt gtc tgt gga act aat gcc ttc aac cct tcc tgc       1089
Asp Asp Ala Leu Phe Val Cys Gly Thr Asn Ala Phe Asn Pro Ser Cys
        130             135             140

aga aac tat aag atg gat aca ttg gaa cca ttc ggg gat gaa ttc agc       1137
Arg Asn Tyr Lys Met Asp Thr Leu Glu Pro Phe Gly Asp Glu Phe Ser
145             150             155             160

gga atg gcc aga tgc cca tat gat gcc aaa cat gcc aac gtt gca ctg       1185
Gly Met Ala Arg Cys Pro Tyr Asp Ala Lys His Ala Asn Val Ala Leu
                165             170             175

ttt gca gat gga aaa cta tac tca gcc aca gtg act gac ttc ctt gcc       1233
Phe Ala Asp Gly Lys Leu Tyr Ser Ala Thr Val Thr Asp Phe Leu Ala
                180             185             190

att gac gca gtc att tac cgg agt ctt gga gaa agc cct acc ctg cgg       1281
Ile Asp Ala Val Ile Tyr Arg Ser Leu Gly Glu Ser Pro Thr Leu Arg
            195             200             205

acc gtc aag cac gat tca aaa tgg ttg aaa gaa cca tac ttt gtt caa       1329
Thr Val Lys His Asp Ser Lys Trp Leu Lys Glu Pro Tyr Phe Val Gln
            210             215             220

gcc gtg gat tac gga gat tat atc tac ttc ttc ttc agg gaa ata gca       1377
Ala Val Asp Tyr Gly Asp Tyr Ile Tyr Phe Phe Phe Arg Glu Ile Ala
225             230             235             240

gtg gag tat aac acc atg gga aag gta gtt ttc cca aga gtg gct cag       1425
Val Glu Tyr Asn Thr Met Gly Lys Val Val Phe Pro Arg Val Ala Gln
                245             250             255

gtt tgt aag aat gat atg gga gga tct caa aga gtc ctg gag aaa cag       1473
Val Cys Lys Asn Asp Met Gly Gly Ser Gln Arg Val Leu Glu Lys Gln
                260             265             270

tgg acg tcg ttc ctg aag gcg cgc ttg aac tgc tca gtt cct gga gac       1521
Trp Thr Ser Phe Leu Lys Ala Arg Leu Asn Cys Ser Val Pro Gly Asp
        275             280             285

tct cat ttt tat ttc aac att ctc cag gca gtt aca gat gtg att cgt       1569
Ser His Phe Tyr Phe Asn Ile Leu Gln Ala Val Thr Asp Val Ile Arg
        290             295             300

atc aac ggg cgt gat gtt gtc ctg gca acg ttt tct aca cct tat aac       1617
Ile Asn Gly Arg Asp Val Val Leu Ala Thr Phe Ser Thr Pro Tyr Asn
305             310             315             320

agc atc cct ggg tct gca gtc tgt gcc tat gac atg ctt gac att gcc       1665
Ser Ile Pro Gly Ser Ala Val Cys Ala Tyr Asp Met Leu Asp Ile Ala
                325             330             335
```

agt gtt ttt act ggg aga ttc aag gaa cag aag tct cct gat tcc acc   1713
Ser Val Phe Thr Gly Arg Phe Lys Glu Gln Lys Ser Pro Asp Ser Thr
          340   345   350

tgg aca cca gtt cct gat gaa cga gtt cct aag ccc agg cca ggt tgc   1761
Trp Thr Pro Val Pro Asp Glu Arg Val Pro Lys Pro Arg Pro Gly Cys
          355   360   365

tgt gct ggc tca tcc tcc tta gaa aga tat gca acc tcc aat gag ttc   1809
Cys Ala Gly Ser Ser Ser Leu Glu Arg Tyr Ala Thr Ser Asn Glu Phe
          370   375   380

cct gat gat acc ctg aac ttc atc aag acg cac ccg ctc atg gat gag   1857
Pro Asp Asp Thr Leu Asn Phe Ile Lys Thr His Pro Leu Met Asp Glu
385   390   395   400

gca gtg ccc tcc atc ttc aac agg cca tgg ttc ctg aga aca atg gtc   1905
Ala Val Pro Ser Ile Phe Asn Arg Pro Trp Phe Leu Arg Thr Met Val
                  405   410   415

aga tac cgc ctt acc aaa att gca gtg gac aca gct gct ggg cca tat   1953
Arg Tyr Arg Leu Thr Lys Ile Ala Val Asp Thr Ala Ala Gly Pro Tyr
                  420   425   430

cag aat cac act gtg gtt ttt ctg gga tca gag aag gga atc atc ttg   2001
Gln Asn His Thr Val Val Phe Leu Gly Ser Glu Lys Gly Ile Ile Leu
          435   440   445

aag ttt ttg gcc aga ata gga aat agt ggt ttt cta aat gac agc ctt   2049
Lys Phe Leu Ala Arg Ile Gly Asn Ser Gly Phe Leu Asn Asp Ser Leu
          450   455   460

ttc ctg gag gag atg agt gtt tac aac tct gaa aaa tgc agc tat gat   2097
Phe Leu Glu Glu Met Ser Val Tyr Asn Ser Glu Lys Cys Ser Tyr Asp
465   470   475   480

gga gtc gaa gac aaa agg atc atg ggc atg cag ctg gac aga gca agc   2145
Gly Val Glu Asp Lys Arg Ile Met Gly Met Gln Leu Asp Arg Ala Ser
                  485   490   495

agc tct ctg tat gtt gcg ttc tct acc tgt gtg ata aag gtt ccc ctt   2193
Ser Ser Leu Tyr Val Ala Phe Ser Thr Cys Val Ile Lys Val Pro Leu
                  500   505   510

ggc cgg tgt gaa cga cat ggg aag tgt aaa aaa acc tgt att gcc tcc   2241
Gly Arg Cys Glu Arg His Gly Lys Cys Lys Lys Thr Cys Ile Ala Ser
          515   520   525

aga gac cca tat tgt gga tgg ata aag gaa ggt ggt gcc tgc agc cat   2289
Arg Asp Pro Tyr Cys Gly Trp Ile Lys Glu Gly Gly Ala Cys Ser His

```
        530                    535                    540

tta tca ccc aac agc aga ctg act ttt gag cag gac ata gag cgt ggc        2337
Leu Ser Pro Asn Ser Arg Leu Thr Phe Glu Gln Asp Ile Glu Arg Gly
545                    550                    555                    560

aat aca gat ggt ctg ggg gac tgt cac aat tcc ttt gtg gca ctg aat        2385
Asn Thr Asp Gly Leu Gly Asp Cys His Asn Ser Phe Val Ala Leu Asn
                       565                    570                    575

ggg cat tcc agt tcc ctc ttg ccc agc aca acc aca tca gat tcg acg        2433
Gly His Ser Ser Ser Leu Leu Pro Ser Thr Thr Thr Ser Asp Ser Thr
                       580                    585                    590

gct caa gag ggg tat gag tct agg gga gga atg ctg gac tgg aag cat        2481
Ala Gln Glu Gly Tyr Glu Ser Arg Gly Gly Met Leu Asp Trp Lys His
                595                    600                    605

ctg ctt gac tca cct gac agc aca gac cct ttg ggg gca gtg tct tcc        2529
Leu Leu Asp Ser Pro Asp Ser Thr Asp Pro Leu Gly Ala Val Ser Ser
         610                    615                    620

cat aat cac caa gac aag aag gga gtg att cgg gaa agt tac ctc aaa        2577
His Asn His Gln Asp Lys Lys Gly Val Ile Arg Glu Ser Tyr Leu Lys
625                    630                    635                    640

ggc cac gac cag ctg gtt ccc gtc acc ctc ttg gcc att gca gtc atc        2625
Gly His Asp Gln Leu Val Pro Val Thr Leu Leu Ala Ile Ala Val Ile
                       645                    650                    655

ctg gct ttc gtc atg ggg gcc gtc ttc tcg ggc atc acc gtc tac tgc        2673
Leu Ala Phe Val Met Gly Ala Val Phe Ser Gly Ile Thr Val Tyr Cys
                       660                    665                    670

gtc tgt gat cat cgg cgc aaa gac gtg gct gtg gtg cag cgc aag gag        2721
Val Cys Asp His Arg Arg Lys Asp Val Ala Val Val Gln Arg Lys Glu
                675                    680                    685

aag gag ctc acc cac tcg cgc cgg ggc tcc atg agc agc gtc acc aag        2769
Lys Glu Leu Thr His Ser Arg Arg Gly Ser Met Ser Ser Val Thr Lys
         690                    695                    700

ctc agc ggc ctc ttt ggg gac act caa tcc aaa gac cca aag ccg gag        2817
Leu Ser Gly Leu Phe Gly Asp Thr Gln Ser Lys Asp Pro Lys Pro Glu
705                    710                    715                    720

gcc atc ctc acg cca ctc atg cac aac ggc aag ctc gcc act ccc ggc        2865
Ala Ile Leu Thr Pro Leu Met His Asn Gly Lys Leu Ala Thr Pro Gly
                725                    730                    735

aac acg gcc aag atg ctc att aaa gca gac cag cac cac ctg gac ctg        2913
```

```
Asn Thr Ala Lys Met Leu Ile Lys Ala Asp Gln His His Leu Asp Leu
            740                 745             750

acg gcc ctc ccc acc cca gag tca acc cca acg ctg cag cag aag cgg   2961
Thr Ala Leu Pro Thr Pro Glu Ser Thr Pro Thr Leu Gln Gln Lys Arg
            755                 760             765

aag ccc agc cgc ggc agc cgc gag tgg gag agg aac cag aac ctc atc   3009
Lys Pro Ser Arg Gly Ser Arg Glu Trp Glu Arg Asn Gln Asn Leu Ile
            770                 775             780

aat gcc tgc aca aag gac atg ccc ccc atg ggc tcc cct gtg att ccc   3057
Asn Ala Cys Thr Lys Asp Met Pro Pro Met Gly Ser Pro Val Ile Pro
785                 790             795                 800

acg gac ctg ccc ctg cgg gcc tcc ccc agc cac atc ccc agc gtg gtg   3105
Thr Asp Leu Pro Leu Arg Ala Ser Pro Ser His Ile Pro Ser Val Val
            805                 810             815

gtc ctg ccc atc acg cag cag ggc tac cag cat gag tac gtg gac cag   3153
Val Leu Pro Ile Thr Gln Gln Gly Tyr Gln His Glu Tyr Val Asp Gln
            820                 825             830

ccc aaa atg agc gag gtg gcc cag atg gcg ctg gag gac cag gcc gcc   3201
Pro Lys Met Ser Glu Val Ala Gln Met Ala Leu Glu Asp Gln Ala Ala
            835                 840             845

aca ctg gag tat aag acc atc aag gaa cat ctc agc agc aag agt ccc   3249
Thr Leu Glu Tyr Lys Thr Ile Lys Glu His Leu Ser Ser Lys Ser Pro
            850                 855             860

aac cat ggg gtg aac ctt gtg gag aac ctg gac agc ctg ccc ccc aaa   3297
Asn His Gly Val Asn Leu Val Glu Asn Leu Asp Ser Leu Pro Pro Lys
865                 870             875                 880

gtt cca cag cgg gag gcc tcc ctg ggt ccc ccg gga gcc tcc ctg tct   3345
Val Pro Gln Arg Glu Ala Ser Leu Gly Pro Pro Gly Ala Ser Leu Ser
            885                 890             895

cag acc ggt cta agc aag cgg ctg gaa atg cac cac tcc tct tcc tac   3393
Gln Thr Gly Leu Ser Lys Arg Leu Glu Met His His Ser Ser Ser Tyr
            900                 905             910

ggg gtt gac tat aag agg agc tac ccc acg aac tcg ctc acg aga agc   3441
Gly Val Asp Tyr Lys Arg Ser Tyr Pro Thr Asn Ser Leu Thr Arg Ser
            915                 920             925

cac cag gcc acc act ctc aaa aga aac aac act aac tcc tcc aat tcc   3489
His Gln Ala Thr Thr Leu Lys Arg Asn Asn Thr Asn Ser Ser Asn Ser
            930                 935             940
```

```
tct cac ctc tcc aga aac cag agc ttt ggc agg gga gac aac ccg ccg    3537
Ser His Leu Ser Arg Asn Gln Ser Phe Gly Arg Gly Asp Asn Pro Pro
945                 950                 955                 960

ccc gcc ccg cag agg gtg gac tcc atc cag gtg cac agc tcc cag cca    3585
Pro Ala Pro Gln Arg Val Asp Ser Ile Gln Val His Ser Ser Gln Pro
                965                 970                 975

tct ggc cag gcc gtg act gtc tcg agg cag ccc agc ctc aac gcc tac    3633
Ser Gly Gln Ala Val Thr Val Ser Arg Gln Pro Ser Leu Asn Ala Tyr
                980                 985                 990

aac tca ctg aca agg tcg ggg ctg  aag cgt acg ccc tcg  cta aag ccg  3681
Asn Ser Leu Thr Arg Ser Gly Leu  Lys Arg Thr Pro Ser  Leu Lys Pro
        995                 1000                1005

gac gta  ccc ccc aaa cca tcc  ttt gct ccc ctt tcc  aca tcc atg     3726
Asp Val  Pro Pro Lys Pro Ser  Phe Ala Pro Leu Ser  Thr Ser Met
    1010                1015                1020

aag ccc  aat gat gcg tgt aca  taa tcccagggg aggggggtcag            3770
Lys Pro  Asn Asp Ala Cys Thr
    1025                1030

gtgtcgaacc agcaggcaag gcgaggtgcc cgctcagctc agcaaggttc tcaactgcct   3830

cgagtaccca ccagaccaag aaggcctgcg gc                                 3862


<210>   7
<211>   1030
<212>   PRT
<213>   Homo sapiens

<400>   7

Met Arg Ser Glu Ala Leu Leu Leu Tyr Phe Thr Leu Leu His Phe Ala
1               5                   10                  15


Gly Ala Gly Phe Pro Glu Asp Ser Glu Pro Ile Ser Ile Ser His Gly
            20                  25                  30


Asn Tyr Thr Lys Gln Tyr Pro Val Phe Val Gly His Lys Pro Gly Arg
        35                  40                  45


Asn Thr Thr Gln Arg His Arg Leu Asp Ile Gln Met Ile Met Ile Met
    50                  55                  60
```

```
Asn Gly Thr Leu Tyr Ile Ala Ala Arg Asp His Ile Tyr Thr Val Asp
65              70          75              80


Ile Asp Thr Ser His Thr Glu Glu Ile Tyr Cys Ser Lys Lys Leu Thr
            85              90              95


Trp Lys Ser Arg Gln Ala Asp Val Asp Thr Cys Arg Met Lys Gly Lys
            100             105             110


His Lys Asp Glu Cys His Asn Phe Ile Lys Val Leu Leu Lys Lys Asn
            115             120             125


Asp Asp Ala Leu Phe Val Cys Gly Thr Asn Ala Phe Asn Pro Ser Cys
        130             135             140


Arg Asn Tyr Lys Met Asp Thr Leu Glu Pro Phe Gly Asp Glu Phe Ser
145             150             155             160


Gly Met Ala Arg Cys Pro Tyr Asp Ala Lys His Ala Asn Val Ala Leu
            165             170             175


Phe Ala Asp Gly Lys Leu Tyr Ser Ala Thr Val Thr Asp Phe Leu Ala
            180             185             190


Ile Asp Ala Val Ile Tyr Arg Ser Leu Gly Glu Ser Pro Thr Leu Arg
        195             200             205


Thr Val Lys His Asp Ser Lys Trp Leu Lys Glu Pro Tyr Phe Val Gln
    210             215             220


Ala Val Asp Tyr Gly Asp Tyr Ile Tyr Phe Phe Phe Arg Glu Ile Ala
225             230             235             240


Val Glu Tyr Asn Thr Met Gly Lys Val Val Phe Pro Arg Val Ala Gln
            245             250             255


Val Cys Lys Asn Asp Met Gly Gly Ser Gln Arg Val Leu Glu Lys Gln
            260             265             270
```

Trp Thr Ser Phe Leu Lys Ala Arg Leu Asn Cys Ser Val Pro Gly Asp
    275   280   285

Ser His Phe Tyr Phe Asn Ile Leu Gln Ala Val Thr Asp Val Ile Arg
    290   295   300

Ile Asn Gly Arg Asp Val Val Leu Ala Thr Phe Ser Thr Pro Tyr Asn
305   310   315   320

Ser Ile Pro Gly Ser Ala Val Cys Ala Tyr Asp Met Leu Asp Ile Ala
          325   330   335

Ser Val Phe Thr Gly Arg Phe Lys Glu Gln Lys Ser Pro Asp Ser Thr
        340   345   350

Trp Thr Pro Val Pro Asp Glu Arg Val Pro Lys Pro Arg Pro Gly Cys
      355   360   365

Cys Ala Gly Ser Ser Ser Leu Glu Arg Tyr Ala Thr Ser Asn Glu Phe
    370   375   380

Pro Asp Asp Thr Leu Asn Phe Ile Lys Thr His Pro Leu Met Asp Glu
385   390   395   400

Ala Val Pro Ser Ile Phe Asn Arg Pro Trp Phe Leu Arg Thr Met Val
          405   410   415

Arg Tyr Arg Leu Thr Lys Ile Ala Val Asp Thr Ala Ala Gly Pro Tyr
        420   425   430

Gln Asn His Thr Val Val Phe Leu Gly Ser Glu Lys Gly Ile Ile Leu
        435   440   445

Lys Phe Leu Ala Arg Ile Gly Asn Ser Gly Phe Leu Asn Asp Ser Leu
    450   455   460

Phe Leu Glu Glu Met Ser Val Tyr Asn Ser Glu Lys Cys Ser Tyr Asp

```
465                         470                     475                         480


Gly Val Glu Asp Lys Arg Ile Met Gly Met Gln Leu Asp Arg Ala Ser
                485                 490                 495


Ser Ser Leu Tyr Val Ala Phe Ser Thr Cys Val Ile Lys Val Pro Leu
                500                 505                 510


Gly Arg Cys Glu Arg His Gly Lys Cys Lys Lys Thr Cys Ile Ala Ser
            515                 520                 525


Arg Asp Pro Tyr Cys Gly Trp Ile Lys Glu Gly Gly Ala Cys Ser His
    530                 535                 540


Leu Ser Pro Asn Ser Arg Leu Thr Phe Glu Gln Asp Ile Glu Arg Gly
545                 550                 555                     560


Asn Thr Asp Gly Leu Gly Asp Cys His Asn Ser Phe Val Ala Leu Asn
                565                 570                 575


Gly His Ser Ser Ser Leu Leu Pro Ser Thr Thr Thr Ser Asp Ser Thr
            580                 585                 590


Ala Gln Glu Gly Tyr Glu Ser Arg Gly Gly Met Leu Asp Trp Lys His
        595                 600                 605


Leu Leu Asp Ser Pro Asp Ser Thr Asp Pro Leu Gly Ala Val Ser Ser
    610                 615                 620


His Asn His Gln Asp Lys Lys Gly Val Ile Arg Glu Ser Tyr Leu Lys
625                 630                 635                 640


Gly His Asp Gln Leu Val Pro Val Thr Leu Leu Ala Ile Ala Val Ile
                645                 650                 655


Leu Ala Phe Val Met Gly Ala Val Phe Ser Gly Ile Thr Val Tyr Cys
                660                 665                 670
```

Val Cys Asp His Arg Arg Lys Asp Val Ala Val Val Gln Arg Lys Glu
    675   680   685

Lys Glu Leu Thr His Ser Arg Arg Gly Ser Met Ser Ser Val Thr Lys
    690   695   700

Leu Ser Gly Leu Phe Gly Asp Thr Gln Ser Lys Asp Pro Lys Pro Glu
705   710   715   720

Ala Ile Leu Thr Pro Leu Met His Asn Gly Lys Leu Ala Thr Pro Gly
        725   730   735

Asn Thr Ala Lys Met Leu Ile Lys Ala Asp Gln His His Leu Asp Leu
        740   745   750

Thr Ala Leu Pro Thr Pro Glu Ser Thr Pro Thr Leu Gln Gln Lys Arg
       755   760   765

Lys Pro Ser Arg Gly Ser Arg Glu Trp Glu Arg Asn Gln Asn Leu Ile
    770   775   780

Asn Ala Cys Thr Lys Asp Met Pro Pro Met Gly Ser Pro Val Ile Pro
785   790   795   800

Thr Asp Leu Pro Leu Arg Ala Ser Pro Ser His Ile Pro Ser Val Val
        805   810   815

Val Leu Pro Ile Thr Gln Gln Gly Tyr Gln His Glu Tyr Val Asp Gln
        820   825   830

Pro Lys Met Ser Glu Val Ala Gln Met Ala Leu Glu Asp Gln Ala Ala
       835   840   845

Thr Leu Glu Tyr Lys Thr Ile Lys Glu His Leu Ser Ser Lys Ser Pro
    850   855   860

Asn His Gly Val Asn Leu Val Glu Asn Leu Asp Ser Leu Pro Pro Lys
865   870   875   880

```
Val Pro Gln Arg Glu Ala Ser Leu Gly Pro Pro Gly Ala Ser Leu Ser
            885                     890              895
```

```
Gln Thr Gly Leu Ser Lys Arg Leu Glu Met His His Ser Ser Ser Tyr
            900                     905              910
```

```
Gly Val Asp Tyr Lys Arg Ser Tyr Pro Thr Asn Ser Leu Thr Arg Ser
            915                     920              925
```

```
His Gln Ala Thr Thr Leu Lys Arg Asn Asn Thr Asn Ser Ser Asn Ser
    930                     935              940
```

```
Ser His Leu Ser Arg Asn Gln Ser Phe Gly Arg Gly Asp Asn Pro Pro
945                     950              955                  960
```

```
Pro Ala Pro Gln Arg Val Asp Ser Ile Gln Val His Ser Ser Gln Pro
                965                 970                  975
```

```
Ser Gly Gln Ala Val Thr Val Ser Arg Gln Pro Ser Leu Asn Ala Tyr
            980                     985              990
```

```
Asn Ser Leu Thr Arg Ser Gly Leu  Lys Arg Thr Pro Ser  Leu Lys Pro
            995             1000              1005
```

```
Asp Val  Pro Pro Lys Pro Ser  Phe Ala Pro Leu Ser  Thr Ser Met
    1010              1015                 1020
```

```
Lys Pro  Asn Asp Ala Cys Thr
    1025             1030
```

```
<210>  8
<211>  72
<212>  PRT
<213>  Homo sapiens

<400>  8

Pro Pro Pro Ala Pro Gln Arg Val Asp Ser Ile Gln Val His Ser Ser
1             5                 10                  15
```

Gln Pro Ser Gly Gln Ala Val Thr Val Ser Arg Gln Pro Ser Leu Asn
            20   25   30

Ala Tyr Asn Ser Leu Thr Arg Ser Gly Leu Lys Arg Thr Pro Ser Leu
            35   40   45

Lys Pro Asp Val Pro Pro Lys Pro Ser Phe Ala Pro Leu Ser Thr Ser
            50   55   60

Met Lys Pro Asn Asp Ala Cys Thr
65   70

<210> 9
<211> 65
<212> PRT
<213> Homo sapiens

<400> 9

Pro Pro Pro Gln Pro Gln Arg Lys Pro Gln Val Gln Leu His Val Gln
1   5   10   15

Pro Gln Ala Lys Pro His Val Gln Pro Gln Pro Val Ser Ser Ala Asn
            20   25   30

Thr Gln Pro Arg Gly Pro Leu Ser Gln Ala Pro Thr Pro Ala Pro Lys
            35   40   45

Phe Ala Pro Val Ala Pro Lys Phe Thr Pro Val Val Ser Lys Phe Ser
            50   55   60

Pro
65